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SHORT COMMUNICATION

# Presence of the collared peccary *Pecari tajacu* (Artiodactyla, Tayassuidae) in the far northeast of its Brazilian distribution

## Presença do cateto *Pecari tajacu* (Artiodactyla, Tayassuidae) no extremo nordeste da sua distribuição no Brasil

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## Abstract

The collared peccary *Pecari tajacu* (Artiodactyla, Tayassuidae) is widely distributed and included in the Least Concern (LC) category by the IUCN assessment. However, threats such as hunting and habitat loss have extinguished some of its populations in Brazil. Additionally, much of its current occupation area remains unknown, especially in northeastern Brazil. We herein present the first record of the collared peccary in a Caatinga-Atlantic Forest ecotone in the state of Rio Grande do Norte, northeastern Brazil. This record in a poorly sampled region represents the presence of this species in the most northeastern part of the country and extends its confirmed records for more than 200 km.

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PENSOFT.

**Resumo**

O cateto *Pecari tajacu* (Artiodactyla, Tayassuidae) é amplamente distribuído e incluído na categoria Pouco Preocupante (LC) pela avaliação da IUCN. No entanto, ameaças como caça e perda de habitat extinguiram algumas das suas populações no Brasil. Além disso, boa parte de sua atual área de ocupação permanece desconhecida, especialmente no nordeste do Brasil. Neste trabalho apresentamos o primeiro registro de cateto em um ecótono Caatinga-Mata Atlântica no estado do Rio Grande do Norte, Nordeste do Brasil. Este registro em uma região mal amostrada representa a população mais a nordeste conhecida da espécie e estende seus registros confirmados em mais de 200 km.

**Keywords**

Atlantic Forest, Caatinga, distribution of species, game species, mammalogy

**Palavras-chave**

Mata Atlântica, Caatinga, distribuição de espécie, espécies caçadas, mastozoologia

The collared peccary *Pecari tajacu* (Linnaeus, 1758) is the most widely distributed Tayassuidae in the Americas, since it can be found from the southern portion of the United States of America to northern Argentina (Grubb and Groves 1993). In Brazil, it lives in sympatry with the white-lipped peccary *Tayassu pecari* in most of its distribution, while the third species of the family Tayassuidae is endemic to the South American Chaco, the Chacoan peccary *Catagonus wagneri* (Grubb and Groves 1993). The collared peccary has a diurnal-crepuscular habit and lives in social groups usually comprising five to 25 individuals (Emmons and Feer 1997; Desbiez et al. 2012). The ecological tolerance of this species allows it to occupy different environments, from humid tropical forests to deserts and semiarid environments, as well as to survive in moderately-degraded areas (Grubb and Groves 1993; Desbiez et al. 2012). This large mammal (17–35 kg; Emmons and Feer 1997) is an important seed predator and potential seed disperser (Desbiez and Keuroghlian 2009); it mainly feeds on fruits, seeds, roots, leaves, tubers and even on small vertebrates (Olmos 1993; Emmons and Feer 1997).

The species is currently not considered threatened (Least Concern) in the global assessment by the International Union for the Conservation of Nature (IUCN) due to its wide distribution and occurrence in a variety of habitats, including relatively disturbed environments (Gongora et al. 2011). However, local or regional threats such as intense hunting and continuing habitat destruction raised awareness of the need to monitor its populations (Gongora et al. 2011). *P. tajacu* was also classified as Least Concern in the Brazilian assessment of endangered species, since it is distributed in virtually all Brazilian ecosystems (Gongora et al. 2011; Desbiez et al. 2012). However, its population status changes depending on the region (Desbiez et al. 2012). For example, the species is considered extinct in the Pampas grasslands (Gongora et al. 2011) and in the northeastern Atlantic Forest (Garbino et al. 2018), whereas it is classified as Near Threatened (NT) in the entire Atlantic Forest (Desbiez et al. 2012). In areas of northeastern Brazil dominated by Caatinga vegetation (seasonally dry tropi-

cal forest), the species is categorized as LC; however, it is expected to occupy less than 30% of this semiarid ecosystem, representing the remaining favorable habitats (Desbiez et al. 2012). In the state of Bahia, for example, the collared peccary is classified as Near Threatened (NT), with hunting being its main threat (Cassano et al. 2017).

The scarcity of information about the distribution of mammals such as the collared peccary in northeastern Brazil makes the evaluation of their current distribution area, and the reassessment and updating of their conservation status unfeasible (Cassano et al. 2017). The state of Rio Grande do Norte presents a shortage of mammalogical studies, despite recent records of some species (e.g. Dantas et al. 2015; Marinho et al. 2017) and a single systematic survey (Marinho et al. 2018). Thus, we herein present the first record of the collared peccary specimens in Rio Grande do Norte state, more precisely in a Caatinga-Atlantic Forest ecotone area. The aforementioned ecotone represents the far northeastern point of the known distribution of the species.

The new record of the collared peccary is based on a specimen killed by local hunters in 2013 and opportunistically examined and photographed by M. da Silva (Fig. 1A, B). Besides that, during an expedition in the same area in January 2018, when four researchers (including P.H. Marinho and M. Silva) and one local resident traveled ca. 10 km looking for traces, we found footprints of the collared peccary (Fig. 1C). The forest fragment where the species was recorded has approximately 4,000 ha and is located in the far northeastern state of Rio Grande do Norte, Brazil, between Pureza and Touros municipalities (central geographic coordinates: 5°23'S, 35°39'W; Fig. 2).

For correct identification of the specimen, the collected material (photos and canines), as well as the footprints, were then compared with descriptions on the species in the literature. The collared peccary has a large size and dark brown color mixed with yellow throughout its body (Emmons and Feer 1997; Feijó and Langguth 2013). The hairs are hard and rough and two clear lines extend at shoulder height from the throat to the back, giving the common name of the species (collared peccary) (Feijó and Langguth 2013). The superior canines are straight and well developed, while the lower canines, with triangular section, are long, with sharp edges and high, with their anterior convex contour (Feijó and Langguth 2013). To perform footprint identification, we compared its shape and measurements (approximately 3 cm long and 2.5 cm wide) with data found on the literature (De Angelo et al. 2008; Becker and Dalponte 2013), considering the smaller size of the species in dry and open environments (Emmons and Feer 1997). Unfortunately, the skin of the specimen was discarded by the hunters, but its canines (upper and lower; Fig. 1B) were deposited in the Collection of Mammals of the Federal University of Paraíba (voucher number: UFPB10273; SISBIO permit n° 42501).

Although the herein investigated area is officially within the semiarid domain of the Caatinga (Fig. 2), it presents climatic and vegetation characteristics of an ecotone environment, besides being influenced by the Atlantic Forest domain, specifically by *restinga* formations (sand dune shrub and forested areas). The mean an-

**Figure 1.** Skin (**A**) and canines (**B**) of the collared peccary (*Pecari tajacu*) killed by hunters in 2013 and footprint (**C**) of the species found in 2017 in a Caatinga-Atlantic Forest ecotone in the state of Rio Grande do Norte, northeastern Brazil. Photos: M. da Silva (**A**), E. Vilar (**B**), and P.H. Marinho (**C**).

nual rainfall in the region is 771 mm with the rainy season from March to May (Mascarenhas et al. 2005). The average annual temperature is around 24.7 °C and the mean annual relative humidity is 79% (Mascarenhas et al. 2005). The area has dense vegetation and presents a shrub-arboreal component of about 3 m in height (Fig. 3). *Pityrocarpa moniliformis* (Benth.) (Fabaceae) is a dominant species in the area, growing up to 6 m of height (Fig. 3). A savanna vegetation enclave (Oliveira et al. 2012) surrounds the Eastern portion of the area.

Our record expands the *P. tajacu* known distribution by more than 200 km, besides representing the farthest northeastern record of this species known to date (Fig. 2). Until now, the species was exclusively known in the state of Rio Grande do Norte through fossil records (Araújo-Júnior and Porpino 2011). Historical reports suggest that the species has been extinct in the central-southern region of this state, known as Seridó, since the early 20$^{th}$ century (Faria 2014). The closest records reported in the literature lie on the border between Rio Grande do Norte and the states

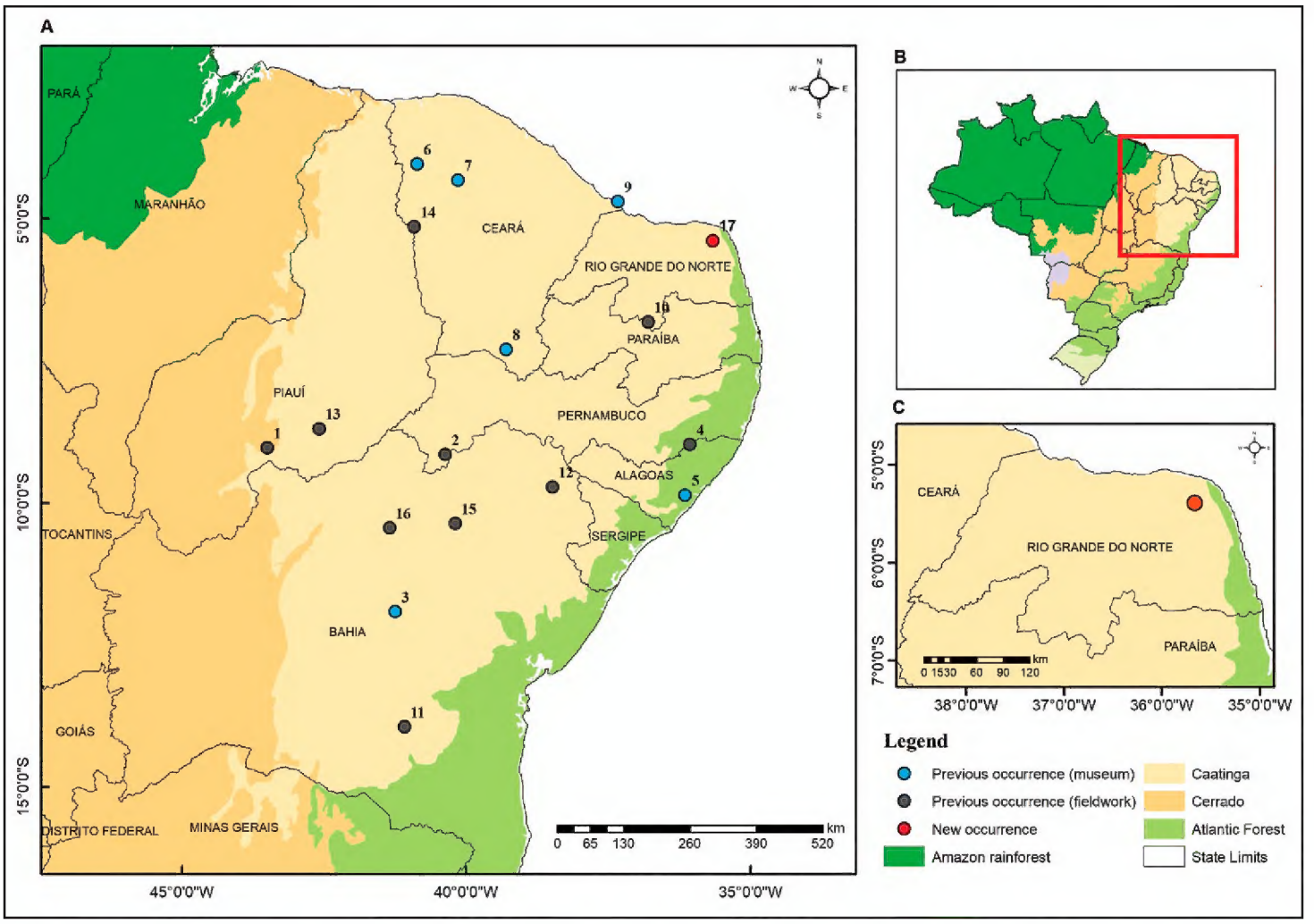


**Figure 2.** Location of records of the collared peccary (*Pecari tajacu*) in northeastern Brazil (**A–B**), including the first record from the state of Rio Grande do Norte (17) in a Caatinga-Atlantic Forest ecotone (**C**). See Table 1 for details of the records.

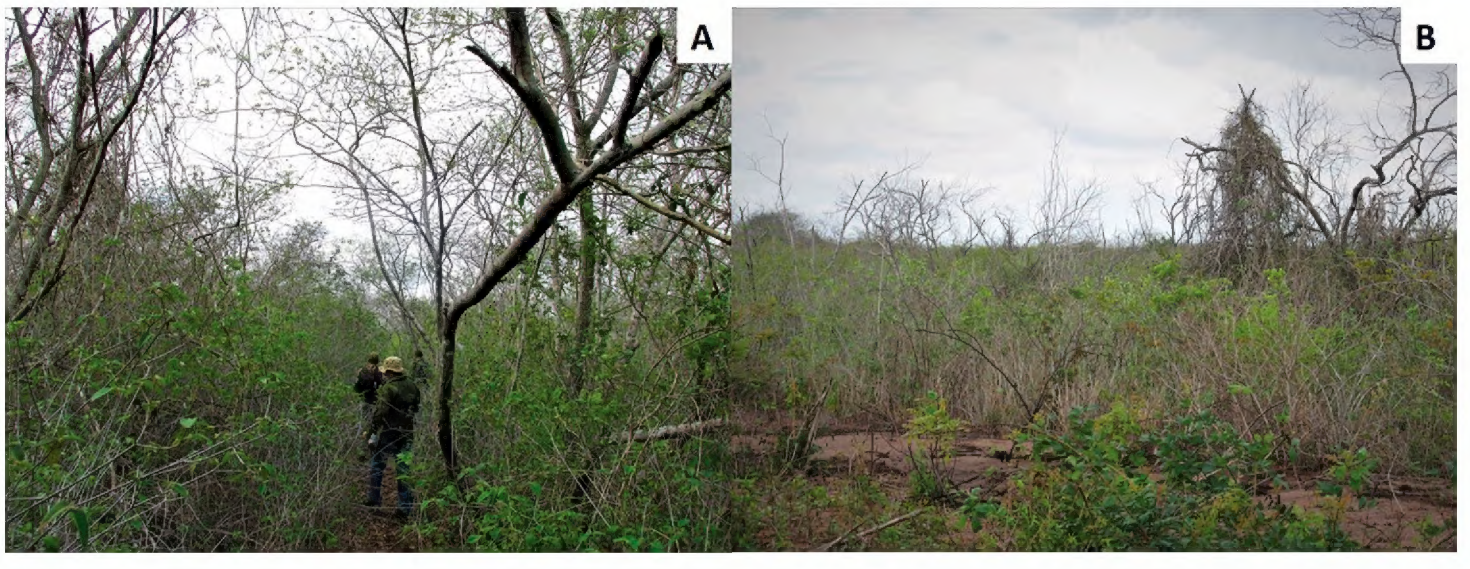


**Figure 3.** Vegetation characteristic of the center (**A**) and periphery (**B**) of the fragment where the collared peccary (*Pecari tajacu*) was recorded in a Caatinga-Atlantic Forest ecotone in the state of Rio Grande do Norte, northeastern Brazil.

of Ceará and Paraíba (Feijó and Langguth 2013; Fig. 2). Recently, the first and broadest sampling inventory of medium to large-sized mammals in the state focused on ten priority Caatinga conservation areas, but did not record the collared peccary (Marinho et al. 2018). Authors suggested that the collared peccary could be locally extinct or with declining populations in more pristine places. However, authors did

**Table 1.** First record of the collared peccary (*Pecary tajacu*) for the state of Rio Grande do Norte in a Caatinga-Atlantic Forest ecotone and literature records in northeastern Brazil. The literature records include a reintroduced population (4) and a population considered extinct (5) following Garbino et al. (2018). The locations have the same code numbers as in the Figure 2.

| Code number | Latitude / Longitude | State | Vegetation domain | Protected area | Record type | Reference |
|---|---|---|---|---|---|---|
| 1 | 09°01'55"S, 43°30'04"W | Piauí | Caatinga-Cerrado Ecotone | Yes | Camera trap photo | Henrique et al. 2007 |
| 2 | 09°09'00"S, 40°22'00"W | Pernambuco | Caatinga | No | Sighting or trace | Cavalcanti et al. 2009 |
| 3 | 11°55'00"S, 41°15'00"W | Bahia | Caatinga-Cerrado-Atlantic Forest mosaic | Yes | Museum specimen | Pereira and Geise 2009 |
| 4 | 08°58'24"S, 36°03'55"W | Alagoas | Atlantic Forest | No | Sighting or trace | Lazure et al. 2010 |
| 5 | 09°52'00"S, 36°09'00"W | Alagoas | Atlantic Forest | No | Museum specimen | Feijó and Langguth 2013 |
| 6 | 04°02'00"S, 40°52'00"W | Ceará | Caatinga | No | Museum specimen | Feijó and Langguth 2013 |
| 7 | 04°19'00"S, 40°09'00"W | Ceará | Caatinga | No | Museum specimen | Feijó and Langguth 2013 |
| 8 | 07°18'00"S, 39°18'00"W | Ceará | Caatinga | No | Museum specimen | Feijó and Langguth 2013 |
| 9 | 04°42'00"S, 37°20'00"W | Ceará | Caatinga | No | Museum specimen | Feijó and Langguth 2013 |
| 10 | 06°49'10"S, 36°48'00"W | Paraíba | Caatinga | No | Specimen killed by hunters | Feijó and Langguth 2013 |
| 11 | 13°54'59"S, 35°04'07"W | Bahia | Caatinga | Yes | Camera trap photo | Silva 2015 |
| 12 | 09°43'15"S, 38°29'00"W | Bahia | Caatinga | Yes | Camera trap photo | Endo 2016 |
| 13 | 08°41'43"S, 42°35'10"W | Piauí | Caatinga | Yes | Camera trap photo | Astete et al. 2017 |
| 14 | 05°08'40"S, 40°54'59"W | Ceará and Piauí | Caatinga | Yes | Camera trap photo | Dias et al. 2017 |
| 15 | 10°21'53"S, 40°11'45"W | Bahia | Caatinga | No | Footprint | Pereira and Peixoto 2017 |
| 16 | 10°26'S, 41°20'W | Bahia | Caatinga | Yes | Camera trap photo | Campos et al. 2019 |
| 17 | 05°23'S, 35°39'W | Rio Grande do Norte | Caatinga-Atlantic Forest Ecotone | No | Specimen killed by hunters and footprint | This study |

not sample the easternmost part of the Caatinga, where it brushes the Atlantic Forest and mesic habitats are more frequent, although often they are also more disturbed.

The collared peccary has been widely distributed throughout northeastern Brazil. Currently, however, the species seems to occupy a restricted portion of this region (Desbiez et al. 2012; Feijó and Langguth 2013) (Fig. 2; Table 1). Recent sampling efforts, especially in the Caatinga (Bezerra et al. 2014; Delciellos 2016; Dias and Bocchiglieri 2016; Dias et al. 2017; Marinho et al. 2018; Campos et al. 2019), have improved our understanding of the richness and distribution of species in northeastern Brazil and thus reduced historical knowledge gaps (Carmignotto and Astúa 2017). However, many of these samples have not recorded the collared peccary over several areas (Bezerra et al. 2014; Delciellos 2016; Dias and Bocchiglieri 2016; Marinho et al. 2018). In fact, approximately 35% of species records are historical (based on museum specimens) and most of the recent literature records (63%) are inside protected areas, mainly in the states of Piauí and Bahia (Table 1), where the largest fragments of the Caatinga can be found (Antongiovanni et al. 2018). However, the species undergoes intense hunting pressure in the region, even within integral protected areas (Miranda and Alencar 2007), which cover just 1.7% of this Brazilian biome (Antongiovanni et al. 2018). In addition, the populations of the northeastern Atlantic Forest were historically extirpated in the region (Garbino et al. 2018), with its only historical record (Feijó and Langguth 2013; see Fig. 2 and

Table 1) given as currently extinct (Garbino et al. 2018). However, today there is a probably reintroduced population in the Atlantic Forest of the state of Alagoas (Garbino et al. 2018) (Fig. 2; Table 1).

The collared peccary is relatively tolerant to moderate environmental disturbances; therefore, its absence is expected in extremely disturbed areas and in habitats experiencing over-hunting (Canale et al. 2012; Desbiez et al. 2012). Thus, the possible extirpation of *P. tajacu* and other large-sized mammals in Northeast Atlantic Forest biodiversity hotspots, and apparently in a large portion of the Caatinga of northeastern Brazil, can be considered as evidence of how much habitat has been lost and of the disturbance these ecosystems have suffered in the region. While the Caatinga currently houses approximately 50% of its original vegetation cover (Antongiovanni et al. 2018), but with high levels of anthropic disturbance (Ribeiro et al. 2015), the Northeast Atlantic Forest is extremely endangered, with approximately 5% of its vegetation cover remaining (Mendes Pontes et al. 2016). Moreover, the intense and historical hunting pressure in these biomes (Alves et al. 2016; Mendes Pontes et al. 2016) threatens the remaining *P. tajacu* populations.

The region of the new collared peccary record is a priority as well as being an extremely important area for Caatinga conservation purposes (Ministério do Meio Ambiente 2016). However, it does not count on any effective legal protection, besides being surrounded, and pressured, by agriculture and agrarian reform settlements, as well as crossed by a highway (RN-023; P.H. Marinho and M. Silva, personal observation). Hunting is another common threat in the area, as suggested by our record and by the bonfire remains that we found in the area (P.H. Marinho and M. Silva, personal observation). In addition, the recent expansion of wind and solar power plants on natural areas in the region (Bernard et al. 2014) may contribute to the loss and degradation of remnant habitats of this species. The informal reports of hunters who frequent the area and locals suggests that collared peccary is resident and is currently restricted to the area, but about 10 years ago, before the expansion of human settlements, it was widely distributed in the region (P.H. Marinho and M. Silva, personal observation).

Our study records for the first time the occurrence of collared peccary in the far northeastern region of Brazil, specifically in the state of Rio Grande do Norte, and considerably extended its known distribution. The conservation status of collared peccary populations in northeastern Brazil, including our study area, is unknown but worrying, as suggested for much of the community of medium and large-sized mammals in the region (Feijó and Langguth 2013; Mendes Pontes et al. 2016; Marinho et al. 2018). Therefore, future studies focused on estimating and monitoring the present and other known collared peccary populations, as well as on assessing other populations in the region and critical habitats for the species, should be performed, specifically to support a new assessment of the conservation status of the species in the region. It is equally essential and urgent conserving these remaining populations through the delimitation and strengthening of protected areas, as well as through measures aimed at reducing the hunting pressure (Desbiez et al. 2012).

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